

REMARKS

Applicants have amended their claims in order to further clarify the definition of various aspects of the present invention. Specifically, Applicants have amended claim 1 to recite that at the end portion of the hollow frame member, the hollow frame member includes a vertical plate, this vertical plate being located such that the rotary tool is above the vertical plate and the vertical plate supports a load during the friction stir welding. Note claim 2. Note also, for example, the structure represented by reference character 36 in Fig. 1; and the member represented by reference character 36 in Fig. 7. Note also, for example, the paragraph bridging pages 4 and 5 of Applicants' specification, together with, for example, the description at page 5, lines 16-20, of Applicants' specification. Applicants have further amended claim 1 to correct a grammatical error, and to clarify that material of the raised portion of the hollow frame member fills any gaps between the hollow frame member and another hollow frame member to be "friction stir" welded to the hollow frame member, which exists when these hollow frame members abut each other.

Claim 2 has been amended to consistently recite the raised portion of the first plate of the hollow frame member, to correct a grammatical error, and to clarify that the gaps are between the hollow frame member and another hollow frame member to be "friction stir" welded to the hollow frame member; claim 2 has been further amended to recite that the third plate is located such that the rotary tool is positioned above the third plate, and the third plate supports a load during the friction stir welding. In connection with amendments to claim 2, note portions of Applicants' original disclosure referred to previously herein in connection with claim 1.

Claim 3 has been amended to clarify that the second plate is the second plate of the hollow frame member; to refer to gaps between the hollow frame member and

the another hollow frame member to be "friction stir" welded to the hollow frame member; and to recite that the third plate is positioned such that, during the friction stir welding where the rotary tool is inserted into the further raised portion, the third plate of the hollow frame member supports a load. In connection with amendments to claim 3, note, for example, portions of Applicants' original disclosure referred to in connection with claim 1; see also Fig. 10 of Applicants' original disclosure, and the description in connection therewith on page 12 of Applicants' specification.

Initially, Applicants respectfully request that the present amendments be entered. Noting, for example, the portions of Applicants' original disclosure referred to in the foregoing, and also noting the third plate recited in previously considered claim 2, it is respectfully submitted that the present amendments do not raise any new issues, including any issue of new matter. Moreover, noting the present amendments further clarifying various aspects of the present invention achieving advantages of, e.g., avoiding denting of the member during friction stir welding, it is respectfully submitted that the present amendments clearly materially limit issues remaining in connection with the above-identified application, presenting the claims at least in better form for appeal. Furthermore, noting new grounds of rejection in the Office Action mailed April 27, 2006, it is respectfully submitted that the present amendments are clearly timely.

In view of the foregoing, it is respectfully submitted that Applicants have made the necessary showing under 37 CFR 1.116(b)(3), for entry of the present amendments notwithstanding the finality of the Office Action mailed April 27, 2006; and that, accordingly, entry of the present amendments is clearly proper.

Applicants respectfully traverse the rejection of their claims under the first paragraph of 35 USC 112, as failing to comply with the written description

requirement, set forth on page 2 of the Office Action mailed April 27, 2006, in light of the following comments and applicable case law discussed infra. As the basis for this rejection under 35 USC 112, the Examiner contends that the present application does not provide a description of the raised portion having a “substantially” uniform width, and “substantially” uniform height, and wherein an abutted portion of the two hollow frame members extend in a direction “substantially” perpendicular to the thickness direction, the Examiner contending that Applicants only have support for “uniform width”, “uniform height” and “perpendicular”.

However, it is respectfully submitted that reading Applicants’ original disclosure as a whole, there is no criticality set forth in Applicants’ original specification or drawings that the height and width of the raised portion must be “exactly” uniform, or that the abutted portion of the frame members extend in a direction “exactly” perpendicular to the thickness direction of the hollow member. As can be appreciated from Applicants’ original disclosure as a whole, the raised portion has a specific function (e.g., of providing material to fill in any gaps between the abutting members, which gaps could cause indentations during the friction stir welding where said raised portion is not provided); and the direction that the abutted portion extends defines positioning of the hollow frame members relative to a thickness direction of the recited hollow frame member. Taking Applicants’ disclosure as a whole, it is respectfully submitted that one of ordinary skill in the art, as of the filing date of the above-identified application, would have known that Applicants contemplated as part of their invention where the width and height of the raised portion are “substantially” uniform, and where the abutted portion extends in a direction “substantially” perpendicular relative to the thickness direction of the hollow

frame member, and thus the present disclosure satisfies the description requirement of the first paragraph of 35 USC 112.

Even were the Examiner to be correct that the description in the specification is narrower than that in the claim, this does not in and of itself mean that there has been a failure to fulfill the description requirement in the first paragraph of 35 USC 112. See In re Smythe, 178 USPQ 279 (CCPA 1973). The test is whether the application as originally filed clearly conveyed in any way to those skilled in the art to whom it is addressed, the information that Applicants invented the recited structure. Especially in view of functions of the structure as in Applicants' original disclosure and guidance provided to one of ordinary skill in the art in connection therewith, and again noting that Applicants do not attach criticality that the height and width of the raised portion must be "exactly" uniform and that the abutted portion must extend in a direction "exactly" perpendicular to the thickness direction, it is respectfully submitted that Applicants provide sufficient description to satisfy the description requirement of the first paragraph of 35 USC 112.

As to use of the word "substantially", in connection with both the first and second paragraphs of 35 USC 112, the Examiner's attention is respectfully directed to the decision and analysis of the Court of Customs and Patent Appeals in In re Mattison, 184 USPQ 484 (CCPA 1975). In connection therewith, attention is respectfully directed to, for example, the sole full paragraph on page 14 of Applicants' specification. This disclosure, in connection with Fig. 14, discloses face plates 93, 93 supported by vertical plates 96, 96; and states that "[i]n this example 2, the vertical plates 96 are virtually perpendicular to the face plates 93, 94"; and that the "face plates 93, 94 are provided with raised portions 37a, 38a similar to the ones shown in Figure 7". Note especially reference to the vertical plates being "virtually"

perpendicular to the face plates 93, 94. See also page 5, lines 16-20, of Applicants' specification. In other portions of Applicants' specification, Applicants refer to the "vertical" plates 96. As can be seen therefrom, wherein Applicants do not expressly set forth criticality, the feature need not be exact. Correspondingly, it is respectfully submitted that one of ordinary skill in the art would have known that the uniformity of the height and width of the raised portions could be "substantially" uniform, and that the abutted portion of the hollow frame member and the another hollow frame member can extend in a direction "substantially" perpendicular to the thickness direction of the hollow frame member.

In view of all of the foregoing, reconsideration and withdrawal of the rejection of the present claims under the first paragraph of 35 USC 112, is respectfully requested.

Applicants respectfully submit that all of the claims presented for consideration by the Examiner patentably distinguish over the teachings of the references applied by the Examiner in rejecting claims in the Office Action mailed April 27, 2006, that is, the teachings of Japanese Patent Document No. 2-246863 (designated by the Examiner as "Mochizuki, et al."), and of International (PCT) Publication No. WO 95/26254 (Midling, et al.), under the provisions of 35 USC 103.

It is respectfully submitted that the references as applied by the Examiner would have neither taught nor would have suggested such hollow frame member as in the present claims, having, at the end portion of the hollow frame member, a raised portion of the hollow frame member projecting to an outer side in a thickness direction of the hollow frame member from one side face of the hollow frame member, the raised portion being integrally provided on the end portion of the hollow frame member, the hollow frame member being adapted to be used in friction stir

welding and the raised portion being adapted to have a rotary tool inserted therein thus to carry out the friction stir welding, the hollow frame member also having at the end portions thereof a vertical plate, wherein the vertical plate is located such that the rotary tool is above the vertical plate and the vertical plate supports a load during the friction stir welding; wherein the raised portion has a substantially uniform width in the extruded direction of the frame member and has a substantially uniform height; wherein, during the friction stir welding, material of the raised portion of the hollow frame member fills any gaps, between the hollow frame member and another hollow frame member to be welded to the hollow frame member, which exist when these hollow frame members abut each other; and wherein an abutting portion of the two hollow frame members extends in a direction substantially perpendicular to the thickness direction of the frame member. See claim 1; note also claim 2.

In addition, it is respectfully submitted that the applied references would have neither disclosed nor would have suggested such a hollow frame member as in the present claims, having a first plate, a second plate substantially in parallel to the first plate and a third plate connecting the first and second plates, with the raised portion (discussed previously) being integrally provided on an end portion of the first plate, this raised portion projecting to an outer side in a thickness direction of the first plate from one side face of the first plate, and wherein the third plate is located such that the rotary tool is positioned above the third plate and the third plate supports a load during the friction stir welding. See claim 2.

Furthermore, it is respectfully submitted that the applied references would have neither taught nor would have suggested such a hollow frame member as in the present claims, having features as discussed previously in connection with

claim 2, and, moreover, wherein at an end portion of the second plate, at a side of the end portion of the first plate having the raised portion, the hollow frame member has a further raised portion which projects to an outer side in a thickness direction of the second plate from one side face of the second plate, this further raised portion also having such substantially uniform width and height, with this further raised portion adapted to have the rotary tool inserted therein so as to carry out friction stir welding; wherein the third plate is positioned such that, during the friction stir welding wherein the rotary tool is inserted into the further raised portion, the third plate of the hollow frame member supports a load; wherein, during the friction stir welding, material of the further raised portion of the second plate fills any gaps, between the hollow frame member and the another hollow frame member to be welded to the hollow frame member, which exist when the hollow frame members abut each other; and wherein the abutted portion of the two hollow frame member extends in a direction substantially perpendicular to a thickness direction of the second plate. See claim 3.

As will be shown infra, it is respectfully submitted that the combined teachings of the applied references would have neither disclosed nor would have suggested the structure as in the present claims, including the raised portion projecting to an outer side in the thickness direction, or the vertical plate (claim 1) or third plate (claims 2 and 3) and positioning thereof such that the vertical or third plate supports a load during the friction stir welding. Through use of such vertical or third plate, deformation of the joint region when two members are friction stir welded is minimized, due to forces of the friction stir welding being sustained by the vertical or third plates. See, e.g., page 5, lines 16-20, of Applicants' specification.

Moreover, it is respectfully submitted that the teachings of the applied references would have neither disclosed nor would have suggested the claimed hollow frame member, having aspects as in claims 1-3, and additionally wherein the two recited frame members are friction stir welded to each other. See claims 20-22.

In addition, it is respectfully submitted that the teachings of the applied references would have neither disclosed nor would have suggested other features of the present invention as in the remaining, dependent claims, which have features as discussed previously in connection with claims 1, 2 and 3, and further including (but not limited to) wherein the first plate (or first and second plates) of the hollow frame member respectively have exposed outer faces, with the raised portion (or raised portion and further raised portion) respectively projecting beyond the exposed outer faces in the thickness direction (see claims 6 and 10); and/or wherein the exposed outer faces are exposed during the friction stir welding (see claims 7, 11 and 14); and/or wherein the thickness direction is a direction perpendicular to the exposed outer faces and/or one side face (see claims 9, 12, 13 and 15); and/or wherein the raised portion is adapted to have the rotary tool inserted therein in the thickness direction so as to carry out the friction stir welding (see claims 16 and 17); and/or wherein various parts of the hollow frame member are made of a same material as in claims 18 and 19.

It is emphasized that through use of the raised portion in combination with use of the vertical or third plate, indentations (deformation and sunken portions) in the friction stir weld joint can be substantially avoided.

Specifically, through use of the vertical or third plate, forces in the vertical direction due to the friction stir welding are absorbed by the vertical or third plates,

avoiding deformation of the first and second plates of the hollow frame members and thereby avoiding deformation of the friction stir welded joint.

Furthermore, as described, for example, in the last full paragraph on page 9 of Applicants' specification, by including the raised portion which projects to an outer side in a thickness direction of the hollow frame member (or of the first plate), and extends as further recited in the present claims, the abutted portion of the hollow frame members extending as in the present claims, if there is a gap between the hollow frame members before welding the gap can be filled with the material of the raised portions, improving the appearance and reducing the amount of putty required in order to provide a planar surface. That is, sunken portions or recesses in the weld bead, due to material filling the gap, when there is no raised portion, can be avoided, thereby improving the product formed.

Moreover, by integrally providing the raised portion on the end portion of the hollow frame member, with the raised portion adapted to have the rotary tool inserted therein so as to carry out the friction stir welding, manufacturing of the structure being friction stir welded can be easily and effectively achieved (for example, the hollow frame member can be made as a single integral member, e.g., by extrusion, with the raised portion, for example, of a same material as a remainder of the hollow frame member), and friction stir welding with the rotary tool being inserted into this integral raised portion can easily and effectively be performed.

Mochizuki, et al. discloses a vehicular body structure 20 (note Fig. 1) constructed by assembling the appropriate number of window-forming materials 21 and wainscot panel-forming material 23 and pole plate-forming material 24 as the roof structure, and floor-forming material 25 and side beam-forming material 26 as an under frame respectively as occasion demands. Both edge parts of facing inner

plates 28a and outer plates 27b are connected by baseboards 27c; and in the hollow parts surrounded by the inner and outer plates 27a, 27b and baseboards 27c, reinforcing ribs 27d are continued in the trussed state.

It is respectfully submitted that Mochizuki, et al. does not disclose, nor would have suggested structure being friction stir welded; and it is respectfully submitted that this reference would have neither taught nor would have suggested such a hollow frame member adapted to be used in friction stir welding, as in the present claims. Moreover, it is respectfully submitted that this reference does not disclose, nor would have suggested, a hollow frame member, having the raised portion which projects to an outer side in a thickness direction of the hollow frame member from one side face of the hollow frame member and which is provided integrally on the end portion of the hollow frame member, as in the present claims, or the vertical or third plate, as in the present claims. Furthermore, it is respectfully submitted that this reference does not disclose, nor would have suggested, advantages achieved according to the present invention of a hollow frame member having both the third or vertical plate and the raised portion, used in friction stir welding, in avoiding indentations/deformations in the friction stir welded joint utilizing the hollow frame member and thereby avoiding the need for additional processing of filling in the indentations/deformations.

The contention by the Examiner that Mochizuki, et al. shows a raised portion (item 27e in Fig. 2 of this reference) is noted. It is respectfully submitted that structure represented by reference character 27e in Fig. 2 of Mochizuki, et al. does not, inter alia, project to an outer side in a thickness direction of the hollow frame member, as recited in the present claims, and it is respectfully submitted that the

structure represented by reference character 27e in Mochizuki, et al. would have neither taught nor would have suggested the raised portion as in the present claims.

Reference by the Examiner to Items 1 and 2 in Fig. 2 of Mochizuki, et al., is not understood. While Fig. 2 of Mochizuki, et al. has members 21 and 22, there are no items 1 and 2 in Fig. 2 of this reference.

On page 3 of the Office Action mailed April 27, 2006, the Examiner refers to a third plate connecting the first plate and second plate in Mochizuki, et al. and "a raised portion integrally provided on an end portion of the first plate (figure 2 item 27c)" therein. If the Examiner is referring to item 27c as "a raised portion", note that the Examiner has previously referred to item 27e as a raised portion; it is respectfully submitted that the Examiner has improperly referred to two different elements of Mochizuki, et al. for the "raised portion". If item 27c in Fig. 2 is the "third plate" as in the present claims, then clearly item 27e cannot qualify as the raised portion as in the present claims, projecting to an outer side in a thickness direction of the hollow frame member from one side face of the hollow frame member.

Furthermore, it is respectfully submitted that Mochizuki, et al. would have neither taught nor would have suggested the vertical or third plate, which supports a load during the friction stir welding (it being emphasized that Mochizuki, et al. does not even disclose friction stir welding of the described structure), much less positioning of the this vertical or third plate so as to support a load during the friction stir welding, and advantages achieved thereby.

It is further respectfully submitted that Mochizuki, et al. would have neither disclosed nor would have suggested additional features of the present invention as discussed in the foregoing, and advantages thereof.

It is respectfully submitted that the additional teachings of Midling, et al. would not have rectified the deficiencies of Mochizuki, et al., such that the presently claimed invention as a whole would have been obvious to one of ordinary skill in the art.

Midling, et al. discloses a technique of friction stir welding, wherein the non-consumable probe used in the friction stir welding has a bottom part 23 (shoulder; see Fig. 3) exhibiting a concave surface, while the pin 24 of the probe has an outer surface provided with alternately protruding and recessed parts along its longitudinal axis. See the last full paragraph on page 3. Note also the last full paragraph on page 4. In Figs. 5a-e of this published patent document are displayed schematically in fragmentary perspective views, different types of welds provided by the method and probe including, in Fig. 5c, an overlap weld seam.

Initially, Applicants respectfully traverse the interpretation by the Examiner of the teachings of Midling, et al., and, in particular, the contention by the Examiner that Midling, et al. teaches that the member has a raised portion which projects to a thickness direction of the member from one side face of the member (the Examiner referring to Fig. 5c of Midling, et al.), with this raised portion being a portion adapted to have a rotary tool inserted therein so as to carry out a friction stir welding. As can be seen in Fig. 5c, there is no "raised portion" in Midling, et al. as in the present claims, which projects to an outer side in a thickness direction of the hollow frame member. As seen in the foregoing in connection with discussion as to the teachings of Mochizuki, et al., and as to the teachings of Midling, et al., it is respectfully submitted that the teachings of these references individually and/or in combination would have neither taught nor would have suggested the raised portion as in the present claims, especially which projects to an outer side in a thickness direction of

the hollow frame member from one side face of the hollow frame member and is provided integrally on the end portion of the hollow frame member, with this raised portion being a portion adapted to have a rotary tool inserted therein so as to carry out the friction stir welding.

With respect to the rejection under 35 USC 103, initially it is respectfully submitted that the teachings of Mochizuki, et al. and of Midling, et al. would not have been properly combinable. Thus, it is emphasized that Mochizuki, et al. discloses a body structure of a railway vehicle, and does not disclose use of friction stir welding for fixing the various materials to each other. It is respectfully submitted that one of ordinary skill in the art concerned with in Mochizuki, et al. would not have looked to the teachings of Midling, et al., directed to friction stir welding. In view of the different technologies involved in each, and different problems addressed in each, it is respectfully submitted that the references are directed to non-analogous arts and are thus not properly combinable under 35 USC 103.

In any event, even if the teachings of these references were properly combinable, it is respectfully submitted that the combined teachings would have neither disclosed nor would have suggested the presently claimed invention, including the raised portion and/or vertical (third) plate, much less positioning of the vertical (third) plate so as to support a load during the friction stir welding, and advantages of these features of the present invention in avoiding deformation/indentations in the friction stir welded joint; and/or other features of the present invention as discussed in the foregoing, and advantages thereof.

Furthermore, emphasizing that Midling, et al. shows a solid plate being friction stir welded, clearly the teachings of this reference, alone or in combination with the teachings of Mochizuki, et al., would have neither disclosed nor suggested the

vertical/third plate and location thereof so as to function as set forth in the present claims.

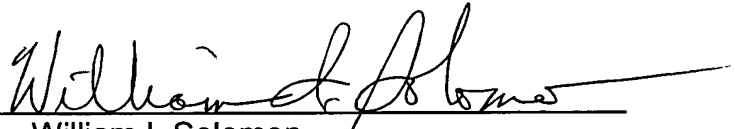
Contentions by the Examiner in the first paragraph on page 5 of the Office Action mailed April 27, 2006, are noted. Claims 20-22 recite the hollow frame member friction stir welded to the another hollow frame member, thereby forming a friction stir welded hollow frame member. Claims 20-22 were added in light of the contention by the Examiner in the first full paragraph on page 3 of the Office Action mailed October 26, 2005, that Applicants only claimed a "hollow frame member", and not, for example, a "friction stir welded hollow frame member". It is respectfully submitted that features according to the present invention referred to by the Examiner in the first paragraph on page 5 of the Office Action mailed April 27, 2006, arise through use of the hollow frame member as in the present claims, utilized in forming the friction stir welded hollow frame member of claims 20-22. It is respectfully submitted that the teachings of the applied references would have neither disclosed nor would have suggested the structure as in, for example, claims 20-22, and advantages achieved due thereto.

In view of the foregoing comments and amendments, entry of the present amendments, and reconsideration and allowance of all claims presently in the application, are respectfully requested.

Applicants request any shortage of fees due in connection with the filing of this paper be charged to the Deposit Account of Antonelli, Terry, Stout & Kraus, LLP, Deposit Account No. 01-2135 (case 503.35255VX4), or credit any excess fees paid to such Deposit Account.

Respectfully submitted,

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